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THE ROD AND FRAME TEST AS A PREDICTOR OF MANAGEMENT STYLE

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THE ROD AND FRAME TEST AS A PREDICTOR OF MANAGEMENT STYLE

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ABSTRACT

This study is concerned with the relationship between field dependence-independence and management style. It was undertaken in order to determine whether the style of management of a manager can be inferred from his scores on the Rod and Frame Test (R.F.T.) of field dependence. Three hypotheses were formulated linking certain styles of management to the field independent manager. A battery of personality tests and measures of management style was applied to a sample of 60 managers from a large firm. In addition an external rating of the managers by their supervisors was also obtained. The analysis involved comparing mean levels of performance of the field dependent and field independent managers, and intercorrelating all the test scores. None of the three hypotheses was supported by the results, though a significant relationship between field independence and cognitive ability was found. Further analyses into the relationship between field dependence, rigidity and management style were carried out. A factor analysis of the Leader Behaviour Description Questionnaire, one of the most important measures of management style used was carried out. The results were not taken as precluding the possibility of using the R.F.T. to predict management style. A number of implications for the assessment of managers were drawn from the results, and recommendations made for further research.

OPSOMMING

Hierdie studie handel oor die verhouding tussen veldafhanklikheid-onafhanklikheid en bestuurstyl. Dit is onderneem ten einde vas te stel of 'n bestuurder se bestuurstyl afgelei kan word uit sy prestasie in die Raam-en-Stafietoets van veldafhanklikheid. Drie hipoteses, waarin sekere bestuurstyle aan die veld-onafhanklike bestuurder toegesê word, is geformuleer. 'n Persoonlikheidstoetsbattery sowel as ander toetse wat bestuurstyl meet, is op 'n steekproef van 60 bestuurders van 'n groot maatskappy toegepas. Daarbenewens is 'n beoordeling van die bestuurders deur hul toesighouers verkry. Die ontleding het die vergelyking van gemiddelde vlakke van prestasie van die veldafhanklike en veld onafhanklike bestuurders ingesluit, sowel as interkorrelasies tussen die beste prestasies. Nie een van die drie hipoteses is deur die uitslae gestaaf nie, hoewel 'n beduidende verband tussen veld-onafhanklikheid en kognitiewe vermoë gevind is. Verdere ontledings van die verband tussen veldafhanklikheid, onbuigsaamheid en bestuurstyl is gedoen. 'n Faktorontleding van die "Leader Behaviour Description Questionnaire", een van die bruikbaarste toetse vir bestuurstyl wat aangewend is, is gedoen. Uit die uitslae kan 'n mens nie noodwendig aflei dat dit onmoontlik is om die Raam-en-Stafietoets te gebruik om die bestuurstyl te bepaal nie. 'n Aantal gevoltrekkings vir die beoordeling van bestuurders word uit die resultate gemaak en aanbevelings vir verdere navorsing gedoen.

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

SUMMARY

With the growing industrialization of South Africa, the assessment of managers is becoming an increasingly pressing problem. The literature has shown that there are many inadequacies in the traditional paper-and-pencil tests which are used to predict future managerial behaviour. The aim of this study was to determine a relationship between certain components of managerial style and field dependence-independence as measured objectively by the Rod and Frame Test.

An extensive review of the literature relating to field dependence-independence and management style was undertaken. The terms "field dependence-field independence" were used by Witkin to describe the perceptual style of individuals as measured by his tests. Field dependent individuals have a "global" field approach and are not able to "extract" an item from the context in which it is perceived. Field independent individuals have an "analytic" field approach and are able to disregard the possibly distracting context within which an item is perceived. Witkin's work was found to be particularly valuable because of the measures he devised and because of the vast range of traits that he found to be correlated with field orientation. A number of correlates of field orientation of relevance to managerial behaviour were revealed in the literature. The field independent individual is likely to be: less distractable; more creative; more intelligent; more flexible; less authoritarian; less conforming; more achievement oriented; and more oriented towards and concerned about people than the field dependent individual. Witkin's contribution to psychology was evaluated in the light of certain critical reviews of his work.

Management style was found to be an area of increasing concern in the study of management. Care was taken to distinguish the style of management from the effectiveness of management, since a style which is the most effective in one situation may be inadequate in another. Research was reviewed pointing to the importance of considering the way an individual manages and to the personality and situational variables which have been found to be correlated with management style. The "Managerial Grid" was considered as a useful, though limited scheme of management style. This schema considers management style in terms

of two dimensions: "concern for people" and "concern for production".

The literature revealed that not very much work had been done relating field dependence-independence and management style. What had been done however, suggested to potential fruitfulness of the Rod and Frame Test (R.F.T.) as a predictor of management style. Research revealed that the relationship between field orientation and management style could be summarised as follows: The field independent manager is likely to be characterized by a task orientation, and the field dependent individual by a social orientation.

Three hypotheses were formulated on the basis of the research that was reviewed: It was hypothesized that field independent managers would be:

(a) more task oriented, structuring their jobs to a greater extent than field dependent managers;

(b) less sociable and less characterized by concern for people than field dependent managers; and

(c) more flexible than field dependent managers.

A careful selection of measuring devices for the test battery was made, particularly choosing tests as little influenced by faking on the part of the managers as possible. The test battery consisted of the following measuring devices: The R.F.T.; the N.I.P.R. Leaderless Group Discussion Technique; subscales from the N.I.P.R. scale of Stereopatic Behaviour; the Gough-Sanford Rigidity Scale; subtests from the N.I.P.R. High Level Battery; the N.I.P.R. Pattern Relations Test; and the Leader Behaviour Description Questionnaire (L.B.D.Q.) The L.B.D.Q. was the most important criterion measure used. It is a questionnaire device which is not purported to measure effectiveness of management, but certain behaviours which can be classified under "management style". The tests were applied to a sample of 60 middle-managers from a large firm. A copy of the L.B.D.Q. was also given to the supervisors of the managers to fill in to describe the manager's leader behaviour. Testing was carried out as part of a managerial assessment programme that the firm was undertaking at the time of the study.

The analysis of the results involved comparing mean levels of performance of the field dependent and field independent groups, and

intercorrelating all the test scores. None of the three hypotheses was supported by the results, though a significant positive relationship between field independence and cognitive ability was found. In addition the relationship between rigidity, field dependence-independence, and management style was studied in a Two-way Analysis of Variance design. This was carried out to see whether flexible and rigid field dependent and independent managers differed significantly in management style. It was found that rigid and flexible managers differed significantly in their management style, but field dependence-independence did not contribute to this difference. A factor analysis was carried out on the two administrations of the L.B.D.Q. to investigate the way this test was performing on the sample. It was found that the subscores of the L.B.D.Q. were loading on the same factors thus revealing that it was not measuring a number of unique dimensions on this sample. The two administrations of the L.B.D.Q. did not load on the same factors though they had a similar factor structure. The L.B.D.Q. was not found to be measuring two clear-cut factors corresponding to concern for people and concern for production respectively, as previous research had suggested.

The results were not taken as a negation of the main hypothesis of a relationship between field orientation and management style, nor taken to preclude the possibility of using the R.F.T. to predict management style. The inconclusive findings were taken to have followed from peculiarities of the measuring devices. It was also suggested that the sample might possibly have been pre-selected in terms of management style. Suggestions were made on how to avoid the effects of these difficulties in future studies. The results had a number of implications for further research in the field: further investigation of the industrial applicability of Witkin's research is needed, especially with regard to his schema of perceptual style. It was revealed that the measurement of management style is a complex matter and requires careful selection of tests, that are proven to be valid as well as reliable. A number of suggestions for the selection of measures was made. It was suggested that the concept of management style might need to be reconsidered and that many of the current schemas of management style are oversimplifications. It was concluded that future research might well establish the

validity of field dependence-independence measures, especially the R.F.T., for the assessment of managerial style.

1.0 INTRODUCTION

1.1 AIM OF THE STUDY

The aim of this study is to see whether managers revealed to have one type of perceptual style using the Rod and Frame Test of Witkin, et al (1962), supervise in a different manner from managers revealed to have another type of perceptual style, using the same test.

1.2 THEORY AND RESEARCH WHICH LED UP TO THE PROBLEM

Witkin and Asch (1948) began their research in the area of perception where they observed that there were large individual differences in the capacity of individuals to detect the upright; to tell in a tilted chair and a tilted room, the direction of the vertical. Individuals differed in the relative extent of their dependence on the limited visual field or in their relative ability to utilize body experiences in overcoming the influence of the field. Witkin used the term "field independent" to describe the individuals who were independent of the field in the sense of being able to separate out objects from their embedding contexts. The term "field dependent" referred to the individuals who were less able to separate out objects from their contexts and so were more dependent upon the limited visual field in their perception.

Witkin, et al (1962) have come to use the terms "global-analytical field approach" in place of "field dependence-independence". The two sets of terms describe the same dimension though from a slightly different viewpoint. Global field approach refers to a consistent tendency for experience to be global and diffuse; the organization of the total field determines the way its parts are experienced. Analytic or articulated individuals however, delineate and structure experience, perceiving discrete parts of

the whole.

Witkin's (1962) differentiation hypothesis proposes that the perceptual style of an individual is linked to a number of areas of psychological functioning, such as the way he experiences the world, the way he sees himself and the type of specialized controls and defences that he develops. Little research has been done to evaluate the usefulness of Witkin's measures for such pragmatic applications as the selection of individuals for jobs. The majority of research appears to have been carried out on subjects drawn from university or institutional settings, contributing little to knowledge about the industrial relevance of Witkin's work.

On the basis of Witkin's research it is expected that a manager's perceptual style will be linked to other aspects of his personal functioning such as the way he manages and to characteristics measured by personality questionnaires and tests. Witkin, et al (1962) are careful to point out that no particular perceptual style is best, or is associated with traits which lead to better adjustment. For this reason it is wiser to consider perceptual style and management style, rather than management success. "Management style" refers to behavioural patterns consistently operating within an individual when he is managing people and makes no assumptions about the efficiency or success of his management.

There are a number of different schemas of management style, perhaps the most useful of which is that of Blake and Mouton (1964). They have considered management style from the point of view of two main dimensions: an emphasis upon people and an emphasis upon production. They have proposed a dimensional grid based upon these two dimensions which they term the "Managerial Grid". They maintain that individuals can be placed on the two, nine-point continua: concern for production and concern for people in terms of their management style. These two dimensions form the outer edges of the grid making classification possible in terms of 81 possible positions. In practice, Blake and Mouton tend to work only in terms of five "pure" styles, representing the four corners and midpoint of the grid.

The assumption of the Blake-Mouton Grid is that both concern for people and concern for production is important, and thus that the (9,9) style (high emphasis on production and on people) is the most effective. In both their books, (1964, 1969) they propose that adequate organizational development will follow from a "9,9 approach" to management development.

Management style is not easily measured in view of the complexity of the field and the absence of metrically tenable models. It is probably more complex and more difficult to classify than the Managerial Grid would suggest. Yet the Grid concepts of "concern for production" and "concern for people" provide important anchor points for assessing and describing managerial behaviour. Witkin's measures of field orientation could be useful for predicting behaviour in a management situation provided that they meet the requirements of validity.

2.0 BACKGROUND OF RESEARCH

2.1 MEASURES OF FIELD DEPENDENCE-INDEPENDENCE

Witkin has devised a number of ingenious and very useful measures of field orientation. Since there are a number of different measures it is not absolutely clear what aspects of field dependence-independence they measure. Witkin and his associates (1954) initially measured field orientation in terms of a large number of tests. In their later work (1962) however, they base their "Perceptual Index" of field orientation on three tests: The Rod and Frame Test (R.F.T.); the Body Adjustment Test, which is part of the Tilting-Room Tilting-Chair Test (T.R.T.C.); and the Embedded Figures Test (E.F.T.).

The R.F.T. and T.R.T.C. are orientation tests. The subject has to locate the upright; either deciding when a rod is vertical in the R.F.T., or when his body is vertical in the T.R.T.C. These tests measure the extent to which an individual is influenced by a limited visual field, or is able to resist the influence of the field through effective reference to postural cues. The E.F.T. is a non-

orientation test. The subject is presented with a geometric figure "embedded" in a surrounding context which partially obscures it. The task of the subject is to separate the figure from the configuration in which it occurs.

The "perceptual index" based on these three tests gives comparable weights to each test, thus of course assuming that they are comparable. Witkin, et al (1954, 1962) report high correlations between the tests. Other studies such as that of Elliot (1961) and Adevai, et al (1968b) have not found the relatively high correlations that Witkin found between the measures. Elliot (1961) concluded that the Witkin E.F.T. and R.F.T. must be considered as far from equivalent.

The R.F.T. has been found to have a relatively high reliability. It has generally been found to be more reliable than the E.F.T. Barrett, Thronton and Cabe (1969) applied Witkin's R.F.T. and E.F.T. to a sample of 50 male employees of an aerospace corporation. They report a split-half reliability of 0.96 for the R.F.T., but only 0.58 for the E.F.T. Because the R.F.T. is more reliable than the E.F.T. and less expensive than the T.R.T.C. it seems to be the most acceptable of Witkin's measures.

2.2 CORRELATES OF FIELD DEPENDENCE-INDEPENDENCE

Part of the importance of field dependence-independence lies in the wide number of correlates associated with it. A large body of research has been carried out into the cognitive and personality correlates of field orientation.

Field independence has been found to be positively correlated with form discrimination ability (Vaught and Ellinger, 1966) and with flexibility and speed of closure (Frederiksen, 1968). Field dependence has also been found to be significantly correlated with intellectual ability. (Witkin, et al, 1962; Spotts and Mackler, 1967). The correlation between field independence and intellectual ability may be a function of the nature of intelligence tests, many of which require an ability to reason analytically.

Research has also revealed a number of important personality

correlates of field orientation. The field independent individual has been found to be: less distractable (Bloomberg, 1965); more flexible (Breskin and Gorman, 1969); less authoritarian (Clark, 1968); less conforming (Linton, 1955); more achievement oriented (Honigfeld and Spigel, 1960); and more oriented towards and concerned about people (Crutchfield, et al, 1958); than the field dependent individual.

Witkin has made a major contribution to Psychology, especially in relating perception to other aspects of psychological functioning. He has found a remarkable link between personality and perception. His theory has led to a vast amount of research of tremendous scope, much of it involving ingenious measurement of his concepts. His measures may have opened the way to objective personality measurement.

2.3 MEASURES OF MANAGEMENT STYLE

Any attempt to measure the behaviour of managers is likely to be difficult. Within the industrial situation individuals are keenly aware that they are competing with each other, and that they are being evaluated almost all the time by one superior or another. This means that managers are both extremely wary of all evaluations and measures and also that they are "test sophisticated" - they know only too well what a particular measure is measuring. In addition to these problems is the problem of the sheer complexity of the managerial task. The work managers must do is not easily measured and the information device given by even the best device remains more or less an approximate index of their work.

One of the most important requirements for a measure of management style is that it be relevant to the actual job a manager does, a requirement not easily met by pencil and paper tests. One of the most interesting studies into the problem of managerial assessment was carried out by Hinrichs (1969) on a sample of 47 members of a large marketing organization. He set out to compare "real life" assessments of management potential with situational exercies, paper and pencil ability tests and personality inventories in a two-day assessment programme. Subjects were given various group situational

exercises such as In-Basket exercises; pencil and paper ability tests such as the College Ability Test; and personality inventories also covering management style. A number of concurrent criteria of effectiveness were developed from a review of company personnel records and overall ratings during the programme.

Hinrichs found that the rating scales based on the situational exercises were significantly correlated with the criteria. (Correlations about 0.40). The pencil and paper tests were far less clearly related to the criteria. (Correlations between 0.04 and 0.40). It was found that criteria supposedly indicating the same characteristic were far from perfectly correlated (about 0.50), and there was a lot of overlap in the situational rating scales.

Hinrich's study reveals that it is important that measures of managerial behaviour be constructed on the basis of careful research into what is required. The most adequate measures are likely to be those devised within a proven framework of management and psychological theory.

2.4 CORRELATES OF MANAGEMENT STYLE

Management style is becoming an important consideration of management studies, because of the growing realization that it has very relevant correlates for personnel concerns. Management development programmes emphasize that certain leadership styles should be assessed and developed since such styles are indicative of effective and successful management. Greenwood and McNamara (1969) outline two such programmes designed to modify specific aspects of a manager's leadership style: T-Group training aimed at sensitizing the supervisor towards employee-oriented behaviour; and the Managerial Grid technique, incorporating sensitivity training and attempting to modify manager's attitudes toward both employee-oriented and production-oriented problems.

The Blake-Mouton Grid covers the two dimensions of concern for people and concern for production. Factor-analytic work such as (Stogdill and Coons, 1957) has identified the two factors of "consideration" and "initiating structure" which are very similar to the Blake-

Mouton concepts.

Unfortunately very little is known of the actual correlates of these two dimensions. Korman (1966) undertook a review of research into the relationship of "consideration" and "initiating structure" to organizational criteria. The overall picture was rather disappointing, for most of the correlations reported were significant statistically and only moderately high (about 0.20 and 0.30). "Consideration" appears to have some relation to a "pleasantly affective" work situation, but "structure" does not appear to have consistent correlates over all the studies. Korman pointed out that most of the studies were of a concurrent nature attempting little in the way of prediction. Consequently very little is known about how these management style variables may predict work group performance and the conditions which affect these predictions.

In the light of the numerous situational variables operating and the equivocal nature of current research into management style, an inflexible schema of management style should only be applied with caution. It is doubtful whether two dimensions such as those of Blake and Mouton can adequately describe leader behaviour in all situations. The Managerial Grid is a useful tool aiding understanding, but must not be seen as a complete description of management style.

2.5 FIELD DEPENDENCE-INDEPENDENCE AND MANAGEMENT STYLE

There are a number of specific studies linking field orientation and management style.

Barrett and Thornton (1967) suggested that Witkin's definition of field independence described the type of characteristics engineers would need for successful performance in their jobs. They compared the R.F.T. results of a sample of 46 engineers and technicians with the results Witkin's Rod and Frame Test standardization sample had obtained. They found significant t-test differences between the groups. The engineers and technicians were more field independent than the student standardization sample.

Weissenberg and Gruenfeld (1966) applied the E.F.T. and a number of supervisory measures to 73 civil service supervisors.

Their most important criterion measure was the Fiedler's Least Preferred Co-Worker (L.P.C.) scale. The L.P.C. is thought to give an indication of a supervisor's standing on the two dimensions of "initiating structure" and "consideration". A high score on the L.P.C. suggests "consideration", a low score suggest "initiating structure".

Weissenberg and Gruenfeld found that field dependent supervisors were more considerate ($p<.02$) than field independent supervisors. The low scorers on the L.P.C. (initiating structure type of supervision) however, had intermediate scores on the E.F.T. The authors conclude there is a curvilinear relationship between field independence and leadership style.

Gruenfeld and Arbuthnot (1968) replicated the earlier study, making certain changes. They used the R.F.T. considered sex as a moderator variable, and divided the L.P.C. into competence and socio-emotional subscales. They applied a battery of tests including two forms of the E.F.T., the R.F.T. and the L.P.C. to 55 technical and administrative under-graduates.

They found that low scorers on the L.P.C. (i.e. subjects characterized by "Initiation of structure") were field independent, masculine - the moderator variable, and achievement rather than socio-emotionally oriented. Sex was a moderator since results were clearest for high masculine males. The prediction that there would be no relationship between field independence and ratings on the socio-emotional subscales of the L.P.C. was substantiated. They argue that they made this prediction because field independent subjects do not consider socio-emotionality a salient, competency-related attribute, and although field dependent subjects do, they tend to be generally accepting of others and therefore evaluate all individuals favourably.

Witkin's measures have several clear advantages: a considerable number of validation studies support the construct of field independence, they are objective, reliable, free of social desirability sets and free of varied semantic interpretations. Gruenfeld and Arbuthnot (1968) conclude that field dependence-independence, at least as measured by the R.F.T., is a good indicator of task and socio-emotional orientations. They point out that evidence is accumulating that the field orientation measures may be opening the way

to objective measurement of leadership and management style.

3.0 THE FORMULATION OF HYPOTHESES

The main hypothesis of this study is that the style of management of a manager can be inferred from his scores on tests of field dependence-independence. The main hypothesis is not tested explicitly, but is broken down into three sub-hypotheses which are tested.

3.1 FIRST HYPOTHESIS

Field independent managers are more task oriented, structuring their job to a greater extent than field dependent managers.

RATIONALE AND EVIDENCE

The basis for this hypothesis is the work of Gruenfeld and Arbuthnot (1968). They suggest that the best summary of the relationship between field independence and leadership style is to regard the field independent leader as being characterized by task orientation.

3.2 SECOND HYPOTHESIS

Field independent managers are less sociable and less characterized by "Consideration for Persons" than field dependent managers.

RATIONALE AND EVIDENCE

The basis for this hypothesis is also the work of Gruenfeld and Arbuthnot (1968) who characterize the field dependent leader's style as being socially oriented. Other studies such as that of Weissenberg and Gruenfeld (1966) have found the field dependent leader to be characterized by sociability and concern for people. It appears as if the field independent individual concentrates more upon the task and structural aspects of a job than upon the social aspects of a job. Witkin et al (1962) suggested that extremely field independent indi-

viduals were sometimes considered as rather cold and distant.

3.3 THIRD HYPOTHESIS

Field independent managers are more flexible than field dependent managers.

RATIONALE AND EVIDENCE

It would seem to follow from the field independent manager's independence from the field that he would be more open to change than the field dependent manager. Evidence on this hypothesis is not conclusive and very little has been done in the field of management. The research of Linton (1955), Breskin and Gorman (1969), and Haronian and Sugerman (1967) provides positive evidence of a relationship between field independence and flexibility. Perhaps the most pertinent study is that of Gruenfeld and Arbuthnot (1969) who found that field independent individuals were more flexible in their ratings of others than were field dependent individuals.

4.0 EXPERIMENTAL DESIGN

4.1 THE SAMPLE

The sample consisted of 60 male middle-managers from a large firm on the Witwatersrand.

The sample was drawn from Grades 5-7 of the firm which cover middle-management levels.

46 of the subjects were English-speaking and 14 Afrikaans-speaking. All the Afrikaans subjects spoke English fluently. The mean age of the sample was 32.5 years and the standard deviation of their age was 6.73 years. The mean length of time that the managers had been at the company was 4.7 years (standard deviation of 3.8 years).

The educational qualifications of the sample were as follows:

University graduates (fifteen or more years of education) N = 14

Technical post matric training (thirteen or more years of education) N = 14

Matric/standard 10 (twelve years of education) N = 20

Less than twelve years of education N = 12

The mean number of years of education was 12.95, and the standard deviation was 1.97 years.

4.2 THE MEASURING DEVICES

4.2.1 The Rod and Frame Test

For a study of managers where external assessments are more desirable than self-assessments, it was deemed preferable to use the T.R.T.C. or R.F.T. rather than the pencil and paper E.F.T. For economic and practical considerations the R.F.T. was chosen instead of the T.R.T.C.

Gruenfeld and Arbuthnot (1968) single out the R.F.T. as the measure of field orientation most suited to measuring task and socio-emotional orientation within the context of leadership.

The R.F.T. measures the ability of an individual to locate the upright by means of a rod "embedded" in the context of a tilted frame. The subject's chair can also be tilted out of the vertical position so that neither the position of the subject's body nor the position of the frame correspond with the true vertical position. Since the frame does not correspond with the upright position and is moved independently of the rod, it forms a type of misleading visual context for the subject. Those individuals who are more affected by the misleading visual context are "field dependent", those less affected by the field are "field independent".

The R.F.T. used in this study was designed by the National Institute for Personnel Research and is based upon the same rationale as the R.F.T. of Witkin, et al (1954, 1962). The reliability of the R.F.T. as found in this study is presented in Table 1.

4.2.2 The Management Style Measures

(a) Leader Behaviour Description Questionnaire (L.B.D.Q.)

A particular concern of this study was to measure management style in terms of the two fundamental dimensions of "concern for people" and "concern for production". It was decided to use the L.B.D.Q. because it does cover these two dimensions and is supported by an extensive body of research. Furthermore it is an external assessment and refers to specific behaviour of a leader in the work situation.

The L.B.D.Q. is the fruit of years of research and was developed as part of the Ohio State University research programme on leadership. (See Stogdill and Coons, 1957). It was constructed around the factors of Consideration and Initiation of Structure which are two of its subscales.

The questionnaire consists of 100 items used to describe the behaviour of a leader. It is usually used by one individual to rate the behaviour of another, but it can also be used by an individual to describe his own leadership behaviour. It consists of the following 12 subscales:

Tolerance of Uncertainty;
Initiation of Structure;
Persuasiveness;
Tolerance of Freedom;
Role Assumption;
Consideration;
Superior Orientation;
Production Emphasis;
Representation;
Demand Reconsiliation;
Predictive Accuracy; and
Integration.

The manual (Stogdill, 1963) gives no information

on the relationship between the scales of the L.B.D.Q., thus it is not known whether they are independent or correlated. In Chapter 1 of Stogdill and Coons (1957) a report on the earlier 150 item version of the L.B.D.Q. is given. This scale was found to consist of correlated dimensions which did not appear to measure unique aspects of behaviour. Since the Consideration and Initiation of Structure Scales of the L.B.D.Q. used in this study were constructed to measure two different factors however, it is probable that they should be regarded as relatively independent of each other.

The "Initiation of Structure" and "Consideration" scales are of particular relevance to this study since they measure task and social management orientation respectively. The reliability estimates for these two scales as found in this study are presented in Table 1.

(b) N.I.P.R. Leaderless Group Discussion Technique (L.G.D.)

The L.G.D. was chosen as a situational measure of management style, sampling the actual behaviour of a group of managers in a discussion situation.

A group of five or six managers meet together to discuss a number of topics. In this study the managers discussed four topics: two management ones and two non-management ones, following suggestions laid down in the manual (Mauer and Osrin, 1968).

Five traits are assessed in the L.G.D.: Degree of Participation in the group; perceptiveness; organising ability; acceptability by the group; and flexibility. There are standardized instructions and explicit scale definitions for each point on the five point rating scale. The last three traits or dimensions are used in this study. The reliability estimates for these three dimensions as found in this study are presented in Table 1.

(c) Gough-Sanford Rigidity Scale

The Gough-Sanford Rigidity Scale is one of the subscales of the California Psychological Inventory (Gough, 1960) where it is labelled "FX, Flexibility". It is a short scale-comprising 22 items of the true-false type, and is easily administered. The reliability of this scale as estimated in this study is presented in Table 1.

(d) N.I.P.R. Scale of Stereopathic Behaviour (S-Scale)

The S-Scale used in this study is a lengthened version of one devised by Schepers (1968) to measure stereopathic behavioural patterns (authoritarianism). It consists of 108 items and is divided into nine subscales. The subscales of "Conventionality" and "Compulsiveness" were chosen as additional measures of flexibility to those already outlined.

The S-Scale is still an experimental test and has no manual available. The reliability estimates for these two scales as found in this study are presented in Table 1.

4.2.3 The Cognitive Ability Measures

Three cognitive ability tests were included in the test battery to assess the general level of intelligence of the managers. This was to find out whether there is a positive correlation between field independence and intelligence. Critics of Witkin such as Zigler (1963) have suggested that the correlations between field independence and other scores which Witkin reports, may only be an artifact of the common relationship between all these scores and intelligence.

The tests used were: The "Mental Alertness" and "Arithmetic Problems" tests from the High Level Battery (See manual Beukes, 1969), and the Pattern Relations Test (Barker, 1969).

4.3 METHOD AND PROCEDURE

The testing for this study was done within the Firm's middle-management assessment programme over a two-month period, June-July, 1970.

Subjects were tested individually on the Rod and Frame Test following the procedure laid down for the N.I.P.R. test.

Ratings of managers on the Leaderless Group Discussion were done by members of the firm's personnel department who had been trained in the use of the technique.

The cognitive ability tests were administered to the managers in a group session by the firm's personnel department.

The L.B.D.Q. was given to the manager's supervisors to fill in about the managers. Unfortunately it was only possible to use 49 of the Questionnaires that were returned: Four supervisors returned incomplete records and seven supervisors claimed that they did not have time to fill in questionnaires about their subordinates.

To supplement the supervisor rating of the men, the L.B.D.Q. was also administered to the men in the form of a self rating. The instructions had to be reworded slightly to make this possible.

The self-rating L.B.D.Q., the Gough-Sanford Rigidity Scale and the S-Scale were administered in four group testing sessions. It was necessary to have four sessions because a larger room was not available. The tests were administered by the author and a member of the firm's personnel department.

5.0 STATISTICAL ANALYSIS AND INTERPRETATION OF RESULTS

5.1 GENERAL DESCRIPTIVE STATISTICS

The means, standard deviations, coefficients of skewness and kurtosis and the observed ranges of scores on the tests are shown in Table I. The Statistics for the Leader Behaviour Description Questionnaire (L.B.D.Q.) given to the supervisors are based on 49 cases.

The standard deviations and observed ranges of the scores suggest that there was some restriction of range. This applies particularly to

the L.G.D., where the two extremes of the five-point scales were never used. The standard deviation and range of the R.F.T. however, are particularly acceptable, showing a wide range on the perceptual style measure.

The reliability estimates of the tests are also presented in Table 1. The R.F.T. reliability is a split-half reliability coefficient corrected for length by means of the Spearman-Brown correction formula. The reliabilities quoted for the L.G.D. ratings are inter-situation correlation coefficients corrected for length by the Spearman-Brown formula. Reliability of the Gough-Sanford Rigidity Scale was calculated using the Kuder-Richardson formula 21 with Tucker's (1949) correction. The reliability of the subscales of the S-Scale and the subscales of the L.B.D.Q. were calculated using the Kuder-Richardson formula 20.

The majority of the reliabilities are acceptable, though the reliabilities of the self-rating L.B.D.Q. are much lower than those of the supervisor L.B.D.Q. This was expected and reveals the less acceptable nature of self assessments in the measurement of management style.

5.2 COMPARISON OF MEAN LEVELS OF PERFORMANCE ON THE TESTS

Subjects were divided into field dependent and field independent groups by a median split on the R.F.T. scores. A separate analysis for the 49 supervisor L.B.D.Q. ratings was carried out. F ratios were calculated to test for a significant difference between the variances of the two groups. Only on the Conventionalism scale was the F ratio significant. t-Tests were carried out on all the scales, except on the Conventionalism scale where a Welch test (Pearson and Hartley, 1958, pp.27) was performed. There was no significant difference between the mean Conventionalism scores of the two groups using the Welch test. The comparison of means and variances appears in Table 2.

A number of conclusions can be drawn from the comparisons between field dependent and field independent individuals: All three of the hypotheses of this study are rejected. t-Tests do not reveal any significant differences between the two groups of managers in terms of the measures of management style. It was found however that field independent managers are more quantitatively minded, at least in terms of arithmetic

TABLE 1

Number of cases, Means, Standard Deviations, Skewness, Observed Ranges and Reliabilities

Variable	N	$\bar{X}$	S.D.	Sk.	Kt.	OBSERVED RANGE Max	Min	Reliability
RFT	60	89.48	53.76	1.01	0.48	243	18	0.90
Pattern Relations	60	11.82	5.65	0.80	0.54	29	2	-
Mental Alertness	60	24.25	6.98	-0.01	-0.74	37	11	-
Arithmetic	60	9.01	4.32	0.11	-0.66	18	0	-
Compulsivity	60	39.12	5.47	-0.86	1.07	49	21	0.73
Conventionalism	60	31.92	5.23	2.05	7.98	57	24	0.69
Rigidity	60	11.73	3.75	-0.09	-0.44	19	4	0.75
LGD Organiz.	60	2.42	0.47	0.81	-0.43	3.5	2.0	0.78
LGD Accept.	60	2.91	0.36	-1.09	1.60	3.5	2.0	0.62
LGD Flex.	60	2.49	0.48	0.60	-0.53	3.8	2.0	0.68
LBDQ Struct.	60	42.47	4.62	-0.83	0.37	49	29	0.83
LBDQ Consid.	60	40.58	3.24	-0.19	-0.68	48	34	0.33
Sup. LBDQ Str.	49	40.00	6.32	-0.85	0.40	49	23	0.90
Sup. LBDQ Cons.	49	37.82	4.32	-0.43	-0.61	45	28	0.67

TABLE 2

Comparison of Means and Variances

Variable	FIELD DEPENDENT GROUP N	Mean	S.D	FIELD INDEPENDENT GROUP N	Mean	S.D	F Ratio	T Value
Compulsivity	27	39.96	4.76	27	38.37	6.31	1.76	1.05
Conventionalism	27	32.52	4.15	27	31.63	6.56	2.50	Welch Test
Rigidity	27	11.93	3.51	27	11.37	3.67	1.09	0.57
LGD Organiz.	27	2.41	0.44	27	2.35	0.42	1.10	0.51
LGD Accept.	27	2 86	0.33	27	2 91	0,40	1,47	-0.50
LGD Flex.	27	2.44	0.40	27	2.49	0.54	1.80	-0.39
Self LBDQ Str.	27	42.63	4.10	27	42.70	4.91	1.43	-0.06
Self LBDQ Cons.	27	40.52	3.41	27	40.59	3.00	1.30	-0.08
Sup. LBDQ Str.	26	39.73	6.48	23	40.30	6.26	1.07	-0.31
Sup. LBDQ Cons.	26	37.04	4.03	23	38.70	4.55	1.27	-1.34
Pattern Relations	27	11.78	5.33	27	12.00	6.00	1.26	-0.14
Mental Alertness	27	23.04	6.48	27	25.48	6.93	1.14	-1.34
Arithmetic	27	7.82	3.39	27	10.37	4.22	1.55	-2.45

F Ratios and T Values Underlined are Significant at the 5% level.

ability, than field dependent managers. In addition, field independent managers show significantly more variability in their responses to the Conventionalism subscale of the S-scale than field dependent managers.

5.3 INTERCORRELATION OF THE VARIABLES

The variables were intercorrelated both to replicate the findings of the t-tests and to gain more information regarding the way the various tests were inter-acting. Two separate analyses were carried out: Firstly the results of all 60 subjects were intercorrelated in an analysis which excluded the supervisor L.B.D.Q. Secondly the 11 cases without the supervisor L.B.D.Q. were rejected and the results of the remaining 49 subjects intercorrelated in an analysis which included all the variables. The intercorrelation matrices of the two analyses appear in Tables 3 and 4 respectively.

It can be seen that the intercorrelation matrices confirm the findings of the t-tests: there are no significant management style correlates of the R.F.T.

The L.G.D. dimensions intercorrelate significantly as do the Structure and Consideration subscales of the L.B.D.Q. This may suggest that subjects were high on both styles of management, (the 9,9 style of Blake-Mouton), or that a halo effect might have been operating in the measures.

The correlations within the self-report flexibility measures suggest that the Conventionalism scale is measuring something different from rigidity and compulsivity.

The three cognitive ability measures correlated significantly with each other.

5.4 THE RELATIONSHIP BETWEEN FIELD ORIENTATION, RIGIDITY AND MANAGEMENT STYLE

Haronian and Sugerman (1967) have pointed out that there may be flexible and rigid field dependent and field independent individuals. The objective of this analysis was to see whether dividing field dependent and field independent subjects into flexible and rigid groups would result

TABLE 3

Intercorrelation Matrix of Variables for 60 Cases.

Test	1	2	3	4	5	6	7	8	9	10	11	12
1. RFT	1.00											
2. Pattern Relations	.07	1.00										
3. Mental Alertness	-.05	.51	1.00									
4. Arithmetic	-.23	.36	.73	1.00								
5. Compulsivity	.09	-.26	-.45	-.38	1.00				(N = 60)			
6. Conventionalism	.15	-.20	-.17	-.06	.26	1.00						
7. Rigidity	.05	-.17	-.15	-.27	.56	.23	1.00					
8. LGD Organiz.	.06	.06	-.11	-.09	-.07	-.12	-.09	1.00				
9. LGD Accept.	-.05	.13	.08	-.13	-.13	.03	-.06	.51	1.00			
10. LGD Flex.	.00	-.04	-.24	-.21	.10	-.05	.12	.60	.33	1.00		
11. Self LBDQ Str.	-.12	-.14	-.22	-.19	.23	.16	.31	.10	.02	.09	1.00	
12. Self LBDQ Cons.	-.01	.17	-.12	-.11	.02	.13	.13	.25	.12	.14	.61	1.00

Underlined Correlation Coefficients are Significant at the 5% Level.

TABLE 4

Intercorrelation Matrix of Variables for 49 Cases.

	Test	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	RFT	1.00													
2.	Pattern Relations	.20	1.00												
3.	Mental Alertness	.03	.46	1.00											
4.	Arithmetic	-.15	.41	.72	1.00					(N = 49)					
5.	Compulsivity	.06	-.34	-.39	-.32	1.00									
6.	Conventionalism	.10	-.23	-.07	.05	.18	1.00								
7.	Rigidity	.00	-.13	.05	-.11	.51	.11	1.00							
8.	LGD Organiz.	.10	.15	-.16	-.08	.03	-.06	-.12	1.00						
9.	LGD Accept.	.01	.20	.11	.19	-.17	.04	-.14	.53	1.00					
10.	LGD Flex.	.03	.03	-.24	-.21	.16	-.03	.08	.62	.32	1.00				
11.	Self.LBDQ Str.	.08	-.09	-.21	-.23	.24	.12	.27	.12	-.08	.01	1.00			
12.	Self.LBDQ Cons.	.11	.14	-.12	-.11	-.07	.05	.03	.38	.08	.14	.56	1.00		
13.	Sup.LBDQ Str.	-.07	-.11	-.20	-.08	.25	.08	.16	.20	.01	.23	.46	.24	1.00	
14.	Sup.LBDQ Cons.	-.14	-.12	-.23	-.09	.30	.01	.12	.11	-.10	.28	.23	.26	.68	1.00

Underlined Correlation Coefficients are Significant at the 5% Level.

in a more sensitive prediction of management style than is possible with the R.F.T. alone.

Subjects were divided into four groups on the basis of median cut-offs on their scores on the Rigidity scale and the R.F.T. A two-way Analysis of Variance design was employed to analyse differences in management style between the four groups. The means and standard deviations for the four groups on the criterion tests are presented in Table 5. The Analysis of Variance is presented in Table 6.

The Analysis of variance reveals that rigid and flexible managers differ significantly in their management style, but field dependence-independence does not contribute to this difference.

5.5 FURTHER ANALYSIS OF THE LEADER BEHAVIOUR DESCRIPTION QUESTIONNAIRE

Three separate analyses were carried out: Firstly the two administrations of the L.B.D.Q. were compared for the 49 cases; secondly the self-rating L.B.D.Q. for 60 cases was factor analysed; and thirdly the supervisor L.B.D.Q. for 49 cases was Factor analysed.

5.5.1 Comparison of the Self-Rating L.B.D.Q. and Supervisor L.B.D.Q.

The two administrations of the L.B.D.Q. for the 49 cases who had complete scores on both were analysed. The means, standard deviations, coefficients of skewness and kurtosis, and observed ranges of the 12 scales of each administration appear in Table 7. Scores on the two administrations were intercorrelated with all the other variables. The complete matrix appears in Table 8.

The scales of each L.B.D.Q. correlate very significantly within themselves, but far less significantly between the two administrations. There is little evidence that the two administrations of the L.B.D.Q. are parallel tests, particularly in terms of the correlates of each form. There are few significant correlations between the L.B.D.Q. scales and the other variables in the battery. In particular it can be seen that the R.F.T. does not

TABLE 5

Two-way Analysis of Variance : Means and Standard Deviations of Four Cells.

Cell Name	N	LDG ORGANIZ.		LDG ACCEPT.		SELF LBDQ STR.		SELF LBDQ CONS.	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Flexible Field Indep.	13	2.34	0.42	2.96	0.45	41.29	5.66	39.86	2.80
Rigid Field Indep.	14	2.35	0.44	2.86	0.35	44.54	3.71	41.69	3.07
Flexible Field Depend.	14	2.50	0.38	2.89	0.28	41.07	4.15	40.20	3.10
Rigid Field Depend.	13	2.29	0.50	2.82	0.39	44.58	3.20	40.92	3.87

TABLE 6

TWO-WAY ANALYSIS OF VARIANCE BETWEEN RIGIDITY AND FIELD DEPENDENCE

Criterion	Source of Difference	Sum of Squares	DF	Mean Square	F. Value	Contrast	P less than
LGD Organiz.	Within Cell	9.36	50	0.19			
	Rigidity (R)	0.14	1	0.14	0.72	0.05	0.40
	Field Dependence (F)	0.04	1	0.04	0.22	-0.02	0.64
	Interaction F/R	0.16	1	0.16	0.86	-0.06	0.36
LGD Accept.	Within Cell	6.82	50	0.14			
	Rigidity (R)	0.09	1	0.09	0.64	0.04	0.43
	Field Dependence (F)	0.05	1	0.05	0.34	0.03	0.56
	Interaction F/R	0.00	1	0.00	0.02	0.00	0.90
Self LBDQ Structure	Within Cell	936.00	50	18.72			
	Rigidity (R)	154.07	1	54.07	8.23	-1.69	0.01*
	Field Dependence (F)	0.13	1	0.13	0.01	0.04	0.94
	Interaction F/R	0.23	1	0.23	0.01	0.07	0.91
Self LBDQ Considerat.	Within Cell	513.88	50	10.28			
	Rigidity (R)	22.19	1	22.19	2.16	-0.64	0.15
	Field Dependence (F)	0.41	1	0.41	0.04	0.11	0.84
	Interaction F/R	4.19	1	4.19	0.41	-0.28	0.53

*Significant at the 1% level

TABLE 7

MEANS, STANDARD DEVIATIONS, SKEWNESS, KURTOSIS, and OBSERVED RANGES of LBDQ for 49 CASES

	Test Scales	X	SD	Sk	Kt	Observed Range Max	Observed Range Min
Self Rating LBDQ	Represent.	20.16	2.98	-0.52	-0.32	25	13
	Reconcil.	19.88	2.51	-0.46	0.40	25	13
	Tol. Uncert.	34.59	4.79	-0.31	0.03	45	23
	Persuasion	37.90	5.30	-0.06	-0.60	49	27
	Structure	42.49	4.31	-0.92	0.84	48	29
	Tol. Free.	39.45	4.26	-0.34	-0.06	47	28
	Role Assumpt.	40.96	4.82	-1.10	1.56	49	27
	Consideration	40.33	3.21	-0.29	-0.98	46	34
	Product. Emph.	36.78	4.88	-0.27	-0.72	45	25
	Predictive Acc.	19.18	1.79	-1.04	2.08	22	13
	Integration	21.94	2.48	-0.95	1.28	25	14
	Superior Orient.	41.51	4.12	0.05	-0.45	50	33
Supervisor LBDQ	Represent.	20.06	3.30	-0.79	0.31	25	11
	Reconcil.	18.57	3.24	-1.00	1.67	23	8
	Tol. Uncert.	32.88	5.54	-0.20	-0.42	43	19
	Persuasion	37.76	5.91	-0.37	-0.16	48	23
	Structure	40.00	6.32	-0.05	0.40	49	23
	Tol. Free.	36.22	4.93	-0.11	0.16	48	23
	Role Assumpt.	39.71	7.89	-0.63	-0.57	50	22
	Consideration	37.82	4.32	-0.43	-0.61	45	28
	Product. Emph.	36.49	7.32	-1.09	2.03	48	15
	Predictive Acc.	18.45	2.84	-0.55	0.23	25	11
	Integration	20.49	3.57	-0.82	0.47	25	10
	Superior Orient.	40.20	5.27	-1.14	1.86	49	24

TABLE 8

INTERCORRELATION MATRIX OF ALL VARIABLES FOR 49 CASES

6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
00																												
11	1.00																											
06	-0.12	1.00																										
04	-0.14	0.53	1.00																									
03	0.08	0.62	0.32	1.00																								
03	0.12	0.10	-0.05	0.02	1.00																							
01	0.04	0.18	0.14	-0.12	0.66	1.00																						
04	-0.02	-0.14	0.05	-0.25	0.12	0.39	1.00																					
07	0.22	0.30	0.10	0.07	0.70	0.70	0.23	1.00																				
12	0.27	0.12	-0.08	0.01	0.72	0.63	0.23	0.73	1.00																			
07	0.01	0.28	0.08	-0.07	0.21	0.23	0.01	0.38	0.29	1.00																		
06	0.24	0.17	0.02	-0.09	0.53	0.70	0.21	0.68	0.66	0.23	1.00																	
05	0.03	0.38	0.08	0.14	0.45	0.40	0.07	0.59	0.56	0.37	0.48	1.00																
26	0.29	0.19	0.20	0.19	0.54	0.40	0.15	0.41	0.48	0.17	0.35	0.53	1.00															
18	0.10	0.21	0.02	-0.02	0.61	0.71	0.32	0.77	0.59	0.22	0.64	0.45	0.36	1.00														
12	0.10	0.24	0.02	0.04	0.64	0.56	0.07	0.68	0.75	0.09	0.62	0.45	0.40	0.59	1.00													
05	0.30	0.10	0.06	-0.08	0.41	0.50	0.16	0.52	0.54	0.19	0.41	0.23	0.41	0.54	0.46	1.00												
06	-0.06	0.15	0.10	-0.03	0.45	0.38	0.24	0.41	0.35	0.10	0.52	0.26	0.24	0.32	0.42	0.24	1.00											
04	0.07	0.22	-0.22	0.24	0.21	0.10	-0.06	0.14	0.27	0.00	0.20	0.24	0.23	0.10	0.18	0.05	0.12	1.00										
00	-0.31	-0.13	-0.27	-0.01	-0.20	-0.22	0.11	-0.21	-0.04	-0.16	-0.09	0.04	-0.26	-0.18	-0.13	-0.33	0.09	0.09	1.00									
03	0.06	0.23	0.01	0.13	0.37	0.33	0.11	0.34	0.42	0.09	0.45	0.26	0.20	0.25	0.37	0.19	0.32	0.02	0.00	1.00								
08	0.16	0.20	0.01	0.23	0.46	0.31	0.02	0.36	0.46	0.04	0.49	0.24	0.39	0.26	0.43	0.27	0.68	-0.11	0.80	1.00								
06	-0.16	0.08	-0.22	0.03	-0.09	-0.14	-0.16	-0.15	-0.01	0.18	-0.03	-0.01	-0.35	-0.14	0.01	-0.10	0.00	0.42	0.17	0.01	1.00							
05	0.08	0.25	-0.02	0.18	0.37	0.26	0.04	0.28	0.32	0.02	0.33	0.14	0.24	0.16	0.37	0.12	0.65	-0.09	0.77	0.83	0.07	1.00						
01	0.12	0.11	-0.10	0.28	0.30	-0.02	-0.10	0.17	0.32	0.01	0.18	0.26	0.25	0.02	0.26	0.00	0.40	0.07	0.59	0.68	0.18	0.59	1.00					
02	0.15	0.15	-0.01	0.30	0.40	0.18	-0.11	0.25	0.25	-0.03	0.28	0.17	0.41	0.12	0.24	0.25	0.55	-0.20	0.60	0.82	-0.16	0.68	0.61	1.00				
01	0.07	0.10	-0.01	0.20	0.26	0.29	0.08	0.17	0.30	0.07	0.39	0.16	0.23	0.16	0.15	0.19	0.60	-0.03	0.75	0.75	0.14	0.59	0.61	0.70	1.00			
14	0.17	0.18	-0.05	0.23	0.39	0.22	-0.03	0.28	0.35	-0.01	0.40	0.19	0.41	0.19	0.36	0.19	0.62	-0.01	0.72	0.86	0.15	0.35	0.66	0.76	0.66	1.00		
04	0.10	0.25	-0.08	0.37	0.40	0.10	-0.16	0.28	0.30	0.04	0.26	0.17	0.29	0.10	0.35	0.18	0.72	-0.03	0.63	0.82	0.11	0.77	0.75	0.81	0.63	0.79	1.00	

Underlined Correlation Coefficients are Significant at the 5% level

correlate with subscales of either administration of the L.B.D.Q.

The intercorrelation matrix of the two administrations of the L.B.D.Q. was subjected to the Maximum Likelihood factor analysis procedure (Browne, 1968). Kaiser's (1960) decision rule yielded seven factors for the two L.B.D.Q. scales. The Varimax (Kaiser, 1958) Rotation is presented in Table 9. The factor analysis tends to support the results drawn on the basis of the intercorrelation matrices of the L.B.D.Q. Almost all of the scales of a particular administration of the L.B.D.Q. load highly on one factor, but the two administrations tend to load on different factors. Factor 1 appears to be a "general" self-rating L.B.D.Q. factor; Factor 2 appears to be a general supervisor L.B.D.Q. factor. The other factors are primarily determined by only a single test.

5.5.2 Analysis of the Self-Rating L.B.D.Q.

The scores of the full sample of managers on all the scales of the self-rating L.B.D.Q. were intercorrelated. The matrix of intercorrelations appears in Table 10. The results are similar to those of the self-rating L.B.D.Q. on 49 cases found in Table 8.

The intercorrelation matrix was factor analysed by Thompson's (1934) modification of the Principal Components method which gives an unrotated matrix. Three factors were extracted. The residual matrix (Table 11) reveals that three factors accounted for most of the variance of the test. The Principal factor matrix was rotated orthogonally to simple structure by the Varimax procedure, and obliquely to simple structure by the Direct Quartimin procedure (Jennrich and Sampson, 1966). The three factor matrices as well as the communalities of the scales appear in Table 12. The rotation to oblique simple structure does not impose an orthogonal structure upon the factors but allows the factor axes to move into oblique, correlated positions. It was found that the three factors were correlated with each other as follows: factor 1 with factor 2: r=+0.66; factor 1 with factor 3: r=+0.38; factor 2 with factor 3: r=+0.23. This makes it very clear that the self-rating L.B.D.Q. is not measuring a large number of unique and independent

TABLE 9

VARIMAX FACTOR MATRIX OF LBDQ FOR 49 CASES

	Test	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
Self Rating LBDQ	Represent.	.72	.31	-.01	.09	-.14	-.09	.15
	Reconcil.	.73	.11	.40	.09	-.13	.09	.00
	Tol. Uncert.	.22	-.07	.50	.02	-.08	.06	.02
	Persuasion	.89	.17	.07	.02	-.18	-.12	-.07
	Structure	.80	.25	.12	-.09	.01	-.01	.09
	Tol. Free.	.44	-.07	-.11	.03	.15	.09	.06
	Role Assumpt.	.69	.29	.33	.10	-.04	.06	-.05
	Consideration	.64	.09	-.02	-.16	.02	.01	.29
	Product. Emph.	.43	.22	.04	-.02	-.31	.04	.81
	Predictive Acc.	.78	.06	.24	.02	-.13	-.03	-.04
	Integration	.71	.28	.07	.02	.02	-.23	.05
	Superior Orient.	.68	.19	-.03	.07	-.15	.10	.20
Supervisor LBDQ	Represent.	.30	.62	.20	.41	-.01	-.20	-.03
	Reconcil.	.07	.72	-.04	-.57	.03	.12	.05
	Tol. Uncert.	-.14	-.01	.02	-.12	.46	-.02	-.06
	Persuasion	.26	.78	.24	-.05	.13	.20	-.07
	Structure	.25	.91	.07	.02	-.08	.10	.07
	Tol. Free.	.02	.09	-.18	.19	.95	.10	-.09
	Role Assumpt.	.12	.90	.13	-.03	.02	-.10	-.01
	Consideration	.12	.72	-.24	-.25	.11	.16	.09
	Product. Emph.	.11	.83	-.20	.16	-.33	.19	.10
	Predictive Acc.	.15	.71	.11	.01	.03	.68	-.02
	Integration	.15	.91	.06	.10	.08	-.00	.21
	Superior Orient.	.17	.88	-.32	-.07	-.02	.02	.03

TABLE 10

Intercorrelation Matrix Self-Rating LBDQ For 60 Cases.

Test Scales	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Represent.	1.00											
2. Reconcil.	0.62	1.00										
3. Tol.Uncert.	0.06	0.41	1.00									
4. Persuasion	0.70	0.65	0.18	1.00								
5. Structure	0.71	0.59	0.14	0.72	1.00							
6. Tol.Free.	0.23	0.20	-0.00	0.34	0.30	1.00						
7. Role Assumpt.	0.57	0.72	0.21	0.64	0.64	0.18	1.00					
8. Consideration	0.49	0.43	0.03	0.63	0.61	0.30	0.51	1.00				
9. Product Emph.	0.53	0.43	0.13	0.45	0.53	0.21	0.37	0.58	1.00			
10. Predictive Acc.	0.60	0.66	0.30	0.72	0.59	0.25	0.60	0.44	0.37	1.00		
11. Intergration	0.64	0.53	0.02	0.68	0.78	0.14	0.58	0.52	0.44	0.57	1.00	
12. Superior Orient.	0.46	0.46	0.09	0.55	0.61	0.21	0.42	0.32	0.44	0.53	0.54	1.00

All Underlined Correlation Coefficients are Significant at the 5% Level.

TABLE 11.

Matrix of Residuals for Self-Rating LBDQ on 60 Cases.

	Test Scales	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1.	Represent.	1.00											
2.	Reconcil.	.04	1.00										
3.	Tol.Uncert.	-.06	.01	1.00									
4.	Persuasion.	.02	-.03	-.01	1.00								
5.	Structure	.00	-.02	.05	-.04	1.00							
6.	Tol. Free.	-.01	-.01	-.04	.07	.03	1.00						
7.	Role Assumpt.	-.00	.05	-.04	-.00	.02	-.04	1.00					
8.	Consideration	-.04	-.00	-.01	.01	.00	-.01	.02	1.00				
9.	Product. Emph.	.07	.02	.05	-.07	.01	.00	-.06	.02	1.00			
10.	Predictive Acc.	.01	-.04	.03	.07	-.05	.04	-.00	.01	-.05	1.00		
11.	Integration	-.02	.01	-.01	.00	.03	-.09	.03	.03	-.02	-.01	1.00	
12.	Superior Orient.	-.06	-.01	-.00	.00	.03	.03	-.04	-.03	.08	.04	-.01	1.00

TABLE 12.

Principal Factor Matrix, Varimax Rotation, Direct Quartimin (Oblique) Rotation and Communalities for Self-Rating LBDQ.

Test Scales	PRINCIPAL FACTOR MATRIX. 1.	2.	3.	VARIMAX ROTATION 1.	2.	3.	OBLIQUE ROTATION 1.	2.	3.	Communalities
Represent.	.78	-.03	.14	.69	.34	.20	.71	.10	.03	.63
Reconcil.	.79	.42	-.18	.50	.26	.72	.42	.08	.63	.84
Tol. Uncert.	.23	.45	-.25	.01	-.01	.56	-.07	-.02	.58	.31
Persuasion	.86	-.00	.01	.67	.44	.31	.62	.23	.15	.74
Structure	.87	-.12	.18	.79	.40	.14	.82	.14	-.05	.81
Tol. Free.	.31	-.11	-.07	.20	.27	.06	.12	.25	.00	.11
Rate Assump.	.75	.16	-.06	.54	.33	.43	.48	.15	.32	.59
Consideration	.72	-.52	-.45	.27	.96	.07	-.11	1.07	-.03	.99
Product Emph.	.60	-.17	-.09	.40	.46	.13	.29	.39	.02	.39
Predictive Acc.	.76	.23	-.00	.59	.25	.47	.58	.03	.34	.64
Integration	.79	-.11	.30	.80	.29	.06	.89	-.01	-.14	.72
Superior Orient.	.63	.02	.22	.62	.17	.15	.71	-.07	-.00	.44

leadership dimensions for the sample studied.

5.5.3 Analysis of the Supervisor L.B.D.Q.

The intercorrelation matrix of the scales of the supervisor L.B.D.Q. (appearing in Table 8) was subjected to the same factor analysis procedure as was used for the above analysis on the self-rating L.B.D.Q. It was again decided to specify three factors to be extracted. The matrix of residuals (Table 13) reveals that the three factors were sufficient to account for most of the variance of the test. The Principal Factor Matrix, Varimax and Direct Quartimin rotations, and the Communalities of the scales appear in Table 14. The analysis of the Supervisor L.B.D.Q. shows that in some respects it is behaving in the same way as the Self-Rating L.B.D.Q. even though it may not be measuring quite the same dimensions.

The direct Quartimin Rotation again revealed a correlation between factor 1 and factor 3. The other correlations were not significant: Factor 1 with Factor 2: r=+0.02; Factor 1 with Factor 3: r=+0.41; Factor 2 with Factor 3: r=-0.06. The factors covered by the Supervisor L.B.D.Q. are more independent of each other than those of the self-rating L.B.D.Q.

The factor analytical study of the L.B.D.Q. suggests that this questionnaire is composed for a number of highly correlated scales. Only a few of the scales, in particular the Tolerance of Uncertainty and Tolerance of freedom scales, appear to be independent of the others. The L.B.D.Q. does not yield two factors corresponding to the Structure and Consideration scales, as was found in previous research (Stogdill and Coons, 1957).

On the basis of the factor analysis it was considered likely that the L.B.D.Q. had too many sub-scores since it did not appear to be measuring 12 different dimensions. It was decided to derive scores that corresponded with the factors extracted in the Varimax rotation. Three scores were derived for the self-rating L.B.D.Q. and three scores for the supervisor L.B.D.Q. t-Tests were carried out to see whether field dependent

TABLE 13

Matrix of Residuals for Supervisor LBDQ for 49 Cases.

	Test Scale	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1.	Represent	1.00											
2.	Reconcil.	-.01	1.00										
3.	Tol.Uncert.	.06	.07	1.00									
4.	Persuasion	.01	.03	-.03	1.00								
5.	Structure	.00	.00	-.01	.03	1.00							
6.	Tol.Free.	-.04	-.07	-.00	.00	-.00	1.00						
7.	Role Assumpt.	.00	.05	-.04	.05	-.01	-.00	1.00					
8.	Consideration	.01	-.01	.00	-.03	-.00	.01	-.04	1.00				
9.	Product Emph.	.02	-.05	.00	-.06	-.02	-.00	-.06	.03	1.00			
10.	Predictive Acc.	-.05	-.03	-.03	.12	.03	.04	-.06	-.01	.07	1.00		
11.	Integration	.00	.00	-.00	-.04	-.01	.01	.05	.00	.01	-.02	1.00	
12.	Superior Orient.	.02	.01	-.00	-.09	-.01	.03	.02	.05	.07	-.06	.01	1.00

TABLE 14

Principal Factor Matrix, Varimax Rotation, Direct Quartimin (Oblique) Rotation and Communalities for Supervisor LBDQ.

Test Scales	PRINCIPAL FACTOR MATRIX. 1.	2.	3.	VARIMAX ROTATION. 1.	2.	3.	OBLIQUE ROTATION. 1.	2.	3.	Communalities
Represent.	.62	-.02	.58	.18	.03	.83	.18	.05	.76	.72
Reconcil.	.74	-.09	.46	.88	.03	-.04	.96	.01	-.34	.77
Tol. Uncert.	-.04	.55	-.00	.00	.55	.06	-.01	.55	-.04	.31
Persuasion	.82	.11	-.08	.64	.11	-.52	.69	.11	.26	.70
Structure	.95	-.12	-.07	.74	-.12	-.61	.79	-.12	.29	.92
Tol.Free.	.10	.76	-.13	.05	.77	-.10	.04	.77	.11	.61
Role Assumpt.	.87	-.04	-.10	.66	-.03	-.58	.71	-.03	.30	.76
Consideration	.76	.17	.28	.79	.13	-.18	.86	.12	-.15	.68
Product Emph.	.84	-.31	-.00	.67	-.31	-.50	.73	-.32	.21	.80
Predictive Acc.	.77	.05	.10	.69	.04	-.35	.75	.03	.06	.61
Integration	.91	.05	-.15	.66	.06	-.63	.71	.06	.36	.85
Superior Orient.	.88	.01	.11	.79	-.01	-.41	.86	-.02	.07	.79

and field independent individuals differed in their scores on these new scales of the two administrations of the L.B.D.Q. The means, standard deviations, F ratios and t-values of the two groups on the L.B.D.Q. appear in Table 15.

None of the F ratios or t-values is significant. It appears as if field dependent and field independent subjects do not differ in management style as measured by the L.B.D.Q.

6.0 DISCUSSION AND CONCLUSION

6.1 DISCUSSION OF RESULTS

The main hypothesis of this study was that field dependent and field independent managers would differ in their style of management. It was expected that the Rod and Frame Test (R.F.T.) could be used to predict management style. In this section it is proposed to show that the results of this study while not supporting the main hypothesis, also do not negate it. The findings can be ascribed at least in part to peculiarities of the sample that was tested and in the tests that were applied.

It is likely that some of the correlations with the R.F.T. would have been significant had the sample been larger. One or two extreme scores can upset the complete pattern of relationships when only a small sample is used. It is interesting to note that studies which have produced the most inconclusive findings in the area of field orientation, such as Goldstein, et al (1968) or Adevai, et al (1968) have used small samples of 50 subjects and less. On the other hand a study producing very encouraging results such as that of Crutchfield, et al (1958), was carried out on a sample of 100 with a comprehensive test battery.

It is important to note that much of the research into psychological differentiation and management style such as Barrett and Thornton (1967), Gruenfield and Arbuthnot (1968 and 1969), have made use of undergraduate student samples. Even the work done by Stogdill and Coons (1957) in developing the L.B.D.Q., used business school students in some of the studies. In the present study however, a sample of working managers, participating in a competitive assessment programme was used. These men were very much aware of the fact that they were being assessed

TABLE 15

Comparison of Means and Variances for LBDQ Total Scores

Variable	FIELD DEPENDENT GROUP N	Mean	S.D.	FIELD INDEPENDENT GROUP N	Mean	S.D.	F Ratio	T Value
Self LBDQ Total	27	396.15	31.42	27	393.44	31.92	1.03	0.31
Self LBDQ "8"	27	244.30	23.71	27	244.00	23.86	1.00	0.05
Self LBDQ "2"	27	77.46	6.60	27	76.89	7.20	1.19	0.30
Sup.LBDQ Total	26	373.15	47.07	23	384.65	38.83	1.47	0.94
Sup.LBDQ "9"	26	284.81	42.05	23	294.78	38.62	1.19	0.87
Sup.LBDQ "2"	26	68.12	8.06	23	70.00	9.57	1.41	0.74

No F-Ratios or t-Values are Significant at the 5% Level.

for possible promotion and would have tried to conform to the norm they presumed was required. The tests were especially selected to minimize the possibility of the managers being able to consciously distort the findings, but the fact remains that that entire test situation is likely to have been very different from that in the previous studies using student samples.

It is one of the assumptions of the Blake-Mouton Grid that the most effective managers display the 9.9 style, high on concern for people (consideration) and high on concern for production (structure). It is likely that the managers in the sample were selected on the basis of their effectiveness and so could possibly have had a management style characterized by a relatively high concern for people and production. During their years of service with the company they might have learnt to develop a 9.9 managerial style. In a sample selected for a management style charzcterized by a high ranking on both dimensions, it would naturally be impossible to test hypotheses which required that the two dimensions be independent of one another.

The results in Table 9 show clearly that the two management style dimensions were highly correlated for the sample. The self L.B.D.Q. Structure and Consideration scales correlated positively (0.56). The Supervisor L.B.D.Q. Structure and Consideration scales correlated positively (0.68). The self L.B.D.Q. Structure and the Supervisor L.B.D.Q. Consideration scales correlated positively (0.32). L.G.D. Acceptability and Organization scales correlated positively (0.53). These correlations may be more descriptive of the particular sample used, than of the measuring devices. It should be pointed out of course that restriction of range and variance could also be due to unreliability of the measuring devices.

It is also possible that the managers were quite "test sophisticated". They had been through a series of tests on their initial selection by the firm and would no doubt have completed a number of other tests before beginning the test battery of the present study. The men might have had a good idea of the style of management that was "expected" in the firm.

Though there is some restriction of range on the self assessment measures there is no clear statistical evidence that the sample was a

pre-selected one. The suggestion that the sample was pre-selected can therefore only be a tentative one.

The results have revealed however, that the self-assessment measures were functioning relatively poorly. Table 1 reveals that the self-rating L.B.D.Q. Consideration scale had a particularly low reliability. This scale cannot be accepted as a reliable measure on the basis of the scores of this sample. It is likely that the inconclusive findings reflected peculiarities of the measuring devices.

The pencil and paper self-report measures were used only to supplement the other tests because such measures have been found to be less adequate for measuring managerial style differences. (Adevai, et al 1968a; Hinrichs, 1969). The results of this study confirmed that this type of measure performs less adequately than situational measures and external ratings of managers. The self-rating L.B.D.Q. has lower reliabilities and standard deviations, as well as smaller observed ranges of scores than the supervisor L.B.D.Q. The results also pointed to some peculiarities of the other measures of management style. The L.G.D. did not appear to differentiate between the subjects, and the scales of the L.B.D.Q. were not independent of one another. The factor analyses of the L.B.D.Q. revealed that this questionnaire was in fact giving less information than the 12 sub-scale titles would have suggested.

This study has produced findings of importance to further research in the areas of psychological differentiation and management style. These considerations must be taken into account before further research is undertaken.

The results have not shown that Witkin's R.F.T. is a measure of management style, but they cannot be regarded as having discounted such a possibility. The R.F.T. had the highest reliability of any of the measures in the test battery and seemed less affected by many of the problems facing the specific management style measures. It is not fair to suggest that the R.F.T. is inadequate when there are certain peculiarities of the criterion measures of a study, any more than Postman (1955) could criticise Witkin for having used the rather inadequate personality criterion measures of the time of his first studies. It can be expected that the R.F.T. will prove to be more useful as better criterion measures of management become available.

Part of the reason for the inconclusive findings of research linking field orientation and management style may lie in the concepts of management style within which such research has been done. It is likely that considering the complexity of the way managers supervise in terms of only two dimensions such as those of the Managerial Grid is inadequate. There is no single "leadership" type of personality, and management style will be affected by such factors as the people in the group and the goal to be accomplished.

In the light of such complexity it would seem as if there is a need for some totally new approaches to the measurement of management style. It is important to attempt to create test situations that are as realistic as possible, including as many of the stresses of real management as can be arranged. Possibly a group of managers could be brought into some type of situation like that of the L.G.D., but one in which a stressful confrontation could be arranged. Each manager could be presented the same standard situation but be individually monitored on a video-tape recorder. When the tape is replayed it could be studied by trained assessors who would have a good chance of getting an idea of the actual management style the men will employ under stress.

6.2 CONCLUSION

It was the aim of this study to find out whether Witkin's R.F.T. could be used as a predictor of management style. Witkin's work was considered and found to have a wealth of potential for managerial assessment. The results of this study however, revealed that the R.F.T. was not able to separate out managers in terms of significant differences in managerial style. The results were inconclusive for a number of reasons:

The results have suggested that there were some inadequacies in the measuring devices that were used. In particular it appeared as if the self-ratings were less reliable and less valid than the other devices. The supervisors' ratings of the men might have been affected by a halo effect which introduced a spurious correlation between the different traits and dimensions considered. It was also suggested that the sample might have been relatively pre-selected on management style, showing both concern for people and concern for production. In such a case, the

measuring devices might have been describing the particular sample, and not necessarily the relationship between the attributes.

The results of this study have suggested a number of recommendations for further research:

It is advisable to consider Masculinity-Femininity and intellectual capacity as moderator variables in studies of the correlates of field dependence-independence. Thus it might be necessary to include a Masculinity-Feminity scale in the test battery and to control for intelligence between the field dependent and field independent subjects.

The "Managerial Grid" concept of management style must be re-evaluated, for this study does not make it clear whether the concepts of "concern for people" and "concern for production" are sufficient to account for all the differences in management style between managers. Once the important dimensions of management style have been isolated, tests must be designed to measure them that function adequately in the industrial setting.

It will be necessary to use a measure of managerial style that yields independent dimensions of managerial style. Such a measure would best be applied to a hetereogeneous sample of management trainees who are not self-selected in terms of management style. It is important that research be carried out in an industrial setting, but care must be taken to ensure that a sample of experienced managers is not homogeneous with regard to their management style.

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